

CONSORTIUM FOR INTERNATIONAL DEVELOPMENT



Colorado State University
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ADMINISTRATIVE REPORT No.
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003/76

QUARTERLY REPORT OF
CONTRACT NUMBER GOB/AID-511-92
BETWEEN
THE MINISTRY OF RURAL AFFAIRS AND AGRICULTURE
OF BOLIVIA
AND
CONSORTIUM FOR INTERNATIONAL DEVELOPMENT

Period Reported: April 1, 1976 thru
June 30, 1976

LA PAZ, BOLIVIA

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The following report of Contract activities is submitted in accordance with Paragraph IV-A of Appendix B of said Contract.

ACCOMPLISHMENTS

Personnel and Administration

Max Long departed from Bolivia June 3rd after completion of his tour as agronomist stationed in Santa Cruz. His final report is being prepared for distribution. Dr. Charles Ward has been nominated by the Consortium and approved by MACA and USAID as Max Long's replacement, but as yet he has not been released from Texas A&M for a foreign assignment. Negotiations are continuing.

The five (5) vehicles previously ordered for project use arrived and are being cleared for distribution to Cochabamba and Santa Cruz.

A USAID team began its initial audit of Contract operations and activities.

Technology Development

The agronomic research program programmed for this year has been completed in a cooperative effort between CID technicians and Bolivian counterparts. All experimental tests for oilseeds planted at the Saavedra station have been harvested. Threshing is currently in process, but has been delayed somewhat due to the necessity of drying all materials to a uniform moisture content.

The following trials for this year as set forth in the Plan of Work have been successfully completed.

Soya

1. Comparison of varieties--three tests including a total of 28 different varieties were conducted.
2. Regional trials--one test at Yapacaní with two additional tests conducted by cooperators at Portachuelo and Abapó-Izozog.
3. Date of planting trials.
4. Seeding density - season of planting.
5. Weed control - 18 chemicals were tested.
6. Insect identification - a small collection of insects has been made, but identification is incomplete.

Maní

1. Variety tests - a total of 33 different varieties including both Spanish and Virginia types were compared in three tests.
2. Cercospora control with chemicals.
3. Herbicide tests - one test with 18 chemicals at three rates, and another using 10 chemicals in combination with Treflan.

Miscellaneous

1. Se ame - a variety test with 36 entries.
2. Sunflower - two tests were made. Six varieties planted in November and a second test with 12 varieties planted in February due to late arrival of seed.
3. Castorbeans - seed for only two varieties received.

A plant breeding program for soya was initiated with the pot seed-
ing of 12 varieties to prepare the parental material for the F₁ crosses
to be tested this next planting season. The varieties selected were:
Acadian, Pelican, Colombia and Jupiter (which represent a tall growing
group of varieties), and Visoja, Mineira, Santa Rosa, V-1, Cobb, Semmes-
Bragg & Bossier (which include shorter and more prolific varieties).
These varieties include selections from both Brazil and the United States.

The objective of the soya breeding program is to develop a variety
of soya specifically adapted to the Santa Cruz area. Following are
characteristics considered important in meeting this objective:

1. Improved yield
2. Plant height - has influence on yield and lodging
3. Shattering resistance
4. Lodging resistance
5. Maturity - early maturity consistent with maximum yields
6. Disease resistance
7. Quality - protein and oil content

A tentative research plan for oil seeds for the coming season was
prepared and has received the approval of the Comité de Obras Públicas

in Santa Cruz who with CIAT are now in charge of the Station. A budget for the program is presently under preparation.

Results of this year's agronomic tests are being compiled. Following are a few preliminary observations:

1. Yields of soya were excellent on the Saavedra Station, some varieties producing as much as 4,000 Kg/Ha. The early plantings produced the highest yields. Late plantings were hurt by insufficient rainfall in March and April. Several varieties show yields higher than Pelican which is the variety being widely used.
2. Rootboellia exaltata, a serious weed on the Station, was not satisfactorily controlled by any chemical used.
3. Treflan, contrary to previous results here and elsewhere, was completely ineffective. The particular lot of the chemical used is suspect as Treflan is known to deteriorate rapidly under unfavorable storage conditions.
4. Benlate gave good control of Cercospora in peanuts.

Cereals research planned for this year was completed as follows:

Rice

1. Variety introductions - dry land and paddy types. Only introductions from France were planted since the nursery from the International Rice Institute never arrived. Even so, insufficient seed was received for variety trials so only agronomic characteristics were noted.

2. Comparison of six different insecticides - Plots were lost due to drought.
3. Comparison of cultural practices (e.g., row spacing).
4. Chemical control of rice blast disease - Not seeded due to lack of moisture and delayed arrival of chemicals.
5. Comparison of five different herbicides - Seven were tested for weed control and data recorded. Yield data is unusable due to prolonged dry periods.
6. Irrigated rice experiment - Not attempted due to poor condition of irrigation pump.
7. Three regional trials comparing varieties - One of the trials at San Pedro was abandoned in the absence of a suitable co-operator.
8. Production of basic seed - Completed for Bluebonnet, Bluebelle, and Dawn varieties.

In general, rice research for this year suffered considerably from the absence of moisture. The future of rice research seems closely tied to either the development of irrigated research or location of research in regions with sufficient rainfall.

Corn

1. Introduction and comparison of varieties - 182 introductions from CIMMYT and 214 hybrid selections from Pairumani were tested.
2. Corn breeding - Using a mass selection technique, selections have been made in six varieties.

3. Weed control-testing of 6 herbicides in pre and post-emergence application.
4. Insect control-testing - Completed but data may be questionable due to lodging problems.
5. Regional variety trials - Four of the eight trials planned were completed.
6. Basic seed multiplication - Twenty hectares were planted of the varieties Cubano Amarillo seleccionado, Tuxpeño planta baja and La Posta.

Sorghum

1. Hybrid grain sorghum introductions - Twelve of 22 planned introductions were completed. Seed for the remaining proved to be of poor quality.
2. Regional trials - Only 1 of 5 planned trials were planted due to lack of time and absence of extension agents to assist.

Experimental work in the Cochabamba region has been completed, but the threshing and weighing of the wheat experiments are continuing.

Of the extensive research program planned for this year, only the following experiments were not completed:

Toralapa

1. Genetic variability and hereditary parameters of potato. Not completed due to lack of trained personnel and appropriate equipment.
2. Genetic markers for resistance of Nacobbus sp. Not completed due to lack of trained personnel and appropriate equipment.

3. Nitrogen and phosphorus fertilizer requirements for potatoes. Not completed because total program too large for available personnel.
4. Residual effects of fertilizers on potatoes. Not completed because total program too large for available personnel.

San Benito

1. Plant breeding - crosses in wheat. Not completed due to absence of greenhouse and laboratory.
2. Identification of physiobiological races of *P. graminis*. Not completed due to absence of greenhouse and laboratory.
3. Identification of wheat virus vector. Not completed due to absence of greenhouse and laboratory.
4. Identification of smut species in cereals. Not completed due to absence of greenhouse and laboratory.
5. Quality studies. Not completed because complete set of necessary equipment not available.
6. Irrigation water management. Not completed due to lack of irrigation water.
7. Method of soil preparation. Not completed because program too large for available personnel.

The early April frost together with the late planting caused by lack of moisture, caused serious damage to the potato plots. Yields are low but the data appear to be usable. Previously reported indications of resistance of the native potato variety *Wila Huaca harja* to the nematode *Nacobbus serendipiticus* seem sufficiently confirmed. This and several

other native varieties have also demonstrated cold tolerance to temperatures in the range of -2.5°C to -3.0°C .

Based on these and other data for the past 4 or 5 years from Toralapa, plans for a potato breeding program have been initiated. The breeding program will have four main objectives: (1) nematode resistance, (2) cold tolerance, (3) improved yields, and (4) improved quality.

In addition, chemical control of nematodes in potato seed tubers is being tested during the winter season under greenhouse conditions. Also, five experiments were planted at Pairumani substation utilizing material sent from Perú. This material is a mixture of F_1 to F_5 crosses for improved yields.

A review of the wheat program was held with station technicians and research plans outlined for the coming season. Emphasis will be given to: (a) wheat breeding with special consideration of adapted or local varieties; (b) identification of rust races; (c) cultural practices such as soil preparation, crop rotation, and consortiated croppings. The triticale program is scheduled to be discontinued and the number of foreign variety introductions of wheat will be reduced, likely to those from the USDA world collection and the CIMMYT collection. Barley research will receive increased emphasis, initially in the form of variety introductions. Rust identification work in wheat has already commenced in the San Benito greenhouse. Also, previous wheat breeding work has crosses in the F_6 which appear promising and will be pursued with the increased emphasis on breeding.

Dr. Anthony Hatch, a short-term consultant from Colorado State University, spent three weeks reviewing the fruit research program at San Benito and production problems of the surrounding area. He conferred with the research technicians and gave suggestions on research direction. His preliminary report has been distributed in English for review. His final report is forthcoming shortly. He found the Cochabamba valley well-suited for a temperate fruit industry, especially the drupe species. Among other things, he recommended: (a) adoption of improved technologies at the station, especially the selection of improved varieties from external sources of known production capability under climatic conditions similar to those of Cochabamba; (b) improved technical training of station personnel; (c) consideration of adequate farmer credit for fruit production; (d) improved cooperation between San Benito and the Agricultural College of Cochabamba in the interest of improved research and student training; and (e) educational program and extension emphasis.

An evaluation of the research stations located in the CID project area was completed and published during the quarter (CID Working Paper 003/76). The report focuses on agronomic research with only peripheral consideration of fruit and animal programs. The assessment serves to establish a "benchmark" of current research programs and provides the basis for suggested improvements and long-term redirection of program emphasis. The report discusses a philosophy of agricultural research in the Bolivian context, problems related to physical facilities and station

locations, personnel and training programs, budgeting and financing, and a system for reporting the publication of research results. Finally, the report analyzes the research programs at each station and recommends specific research focus and crop specializations. The agronomic constraints considered important to crop production and thus relevant to experimental research were also identified. In general terms, these constraints include adapted varieties, cultural practices, weeds, insects, diseases, and soil fertility.

Based on initial discussions of the research report, plans were initiated to publish a professional journal on Bolivian agriculture. "Guidelines" for publication have been prepared and the system for reviewing manuscripts and involving Bolivian professional formulated.

The identification of soil fertility problems in the campo as well as in experimental station research programs led to the transfer of Ing. Walter Carrera to IBTA and the creation of a soil fertility testing program. Initially, soil samples are being collected from all research plots at the stations within the project area. Soil analysis will be made and an annual "log" kept for each experimental plot including the type of experiment, the crop, fertilizers added (amount and type), and insecticide and herbicide use. It is anticipated that this system will eventually be expanded to the national level. In addition, a soil testing-plant correlation research program has been planned for San Benito and Toralapa. The program will involve on-station trials for a minimum of 3 years with additional off-station trials conducted on an annual basis.

Implementation of the "Service Center" concept has not progressed satisfactorily due to delays in construction of physical facilities and purchases of other equipment and supplies. Since April, however, some progress has been made. In May, the list of vehicles to be purchased under the 053 Loan were approved and sent to Washington. The farm equipment list was forwarded in June. The list of shop tools is ready and is awaiting MACA and USAID approval. Remaining are the lists for laboratory equipment, office supplies, and University supplies. Preparation of construction plans for buildings is now behind schedule. Plans for the buildings at Toralapa and San Benito are scheduled for bid by the end of July. Those for the substation at La Jota will be finalized by August 30 and for Chinoli by September 15.

Extension Technology

Within the extension program, several administrative policies received inputs from the CID Co-director during this quarter. (1) A written procedure for screening, interviewing and selecting new personnel was prepared and received initial acceptance from IBTA personnel; (2) a salary schedule based on education and experience was prepared and is under review by IBTA; (3) a set of guidelines for preparing job descriptions was prepared and adopted. It is anticipated that formal job descriptions will be prepared for all research and extension personnel.

Programming activities were concerned with organizing and planning a system for presenting research materials to the extension agents.

Since the extension service has no subject-matter specialists as such, the program is being organized around the CID and Bolivian research technicians located at the experiment stations. A list of "package presentations" was developed which can be offered by CID or Bolivian technicians to either extension agents or to campesino groups. The lists are currently being circulated among the CID technicians for their comments and concurrence on the subject matter of each presentation. The initial list of topics include soil fertility and management, economics of agricultural production, agricultural credit, nematology, and soya production. Two types of meetings have also been proposed and are being discussed with the Ministry. The first is a research report meeting at which research and extension personnel associated with a given station will meet jointly to review the research results of the past year and to interchange ideas, especially those related to campesino problems which can be the subject of station research projects. A second is the extension programming meeting whereby extension agents will be presented the "package presentations" by the research technicians and schedules prepared for presentations to campesinos.

The range demonstration program proceeded on schedule. Thirty range cages to protect small areas from grazing use were constructed and distribution commenced among the 30 villages selected for co-operation in the Cochabamba valley. This project will be given high priority in the coming months. A study of potato marketing previously assigned to Ministry personnel in Cochabamba yielded a 5-page report of

background information, but no scientific analysis of the problem. This study will be pursued further.

Field visits were made to seven more regions where consultations were held with the local extension agents. CID personnel also participated in a 5-day short course for campesinos which included such topics as soil conservation, sheep improvement, family health, fertilizer use and weed control. Thirty four campesinos attended. The extension advisor also participated with local extension personnel in assisting a campesino group with the initial analysis of a proposed producer cooperative.

Publication of a monthly newsletter for extension agents was proposed and the initial planning stages completed. A Ministry artist has designed the letterhead and publication of the first issue is expected soon.

An examination of available extension publications was made as well as a summary of recent publications involving dissemination of research information. The supply of existing publications is exhausted. There is no evidence of extension publication of research information in recent years. A review of existing research data and that developed by outside agencies such as the Utah Contract has been initiated to determine what technical information is currently available for extension to the campesinos.

Sector Management

Agricultural Planning. The Plan Quinquenal for Agriculture was approved by CONEPLAN and is currently being published by the Ministry. Two major areas of focus in agricultural planning were identified during the quarter:

- (1) operative plan for implementing the 1977 phase of the 5-Year Plan;
- (2) formal evaluation of projects proposed for the agricultural sector.

The conceptual model for the operative plan has been completed and initiated in Cochabamba. Under this plan, production and other targets identified in the 5-Year Plan will be regionalized and input requirements to accomplish the targets will be identified, both for the private and public sectors. Evaluation of the projects proposed in the 5-year is divided into two steps. First, all projects must be ranked according to the degree to which they correspond with the objectives of the 5-Year Plan and then ~~eliminate~~ those which do not contribute significantly to achievement of the objectives. This initial step has been completed and will soon be published in a working document from the Office of Planning. Approximately 250 individual projects were involved in this analysis. The second step is to rank the remaining projects according to their social profitability so that public funds can be most efficiently allocated. The Ministry has formally requested a short-term consultant (2 months) to assist in supervising this latter activity. The request has been forwarded to the CID offices in Utah.

Reorganization of the Office of Planning has not been completed. Construction of the necessary physical plant changes have been delayed. However, two Economists who recently completed B.S. training have been added to the office staff. The office now has a core staff of three young economists and one agronomist but lacks competence at the M.S.

and Ph.D. levels. The Division of Economic Studies is not functional due to the lack of qualified staff.

Agricultural Marketing. Collection of market prices in La Paz was continued but no weekly publication has been made due to the moratorium discussed in previous reports. With the development of a weekly Extension newsletter, an attempt will be made to disseminate this and other price information to agents throughout the country.

Economic Studies and Policy Analysis. The final draft of the paper "Common-Property Rangeland and the Induced Neighborhood Effects: Resource Misallocations in Bolivian Agriculture" has been completed following reviews by local Bolivians and several experts throughout the United States. Final publication and distribution will be accomplished in July.

The study of Yungas agriculture is progressing but has experienced some unanticipated delays. Analysis of the price data collected earlier has revealed some internal inconsistencies which will require an additional field check during July. Analysis of the Chapare data has not advanced as rapidly as expected by the student at UMSS due to student unrest and closing of the University. However, an initial draft of the study report is expected during the next quarter.

Training

A formal credit course entitled "Land Economics" was presented at the University of San Simon. The course was conducted over a period of

4 weeks. Twenty five students attended the course of which thirteen registered for and received 3 hours credit from Utah State University. Another credit course entitled "Farm Management" has been scheduled at the same University for July or August. In addition, a formal agreement between UMSS and MACA has been prepared which calls for close cooperation between these entities in developing trained agriculturalists with the assistance of CID technicians. The agreement has been forwarded to MACA for signature. To date, no effective cooperation has been effected with the Agronomy Department at UMSS despite contacts by CID technicians. This effort is continuing.

A symposium on agricultural development and other seminars on agronomic problems scheduled at Gabriel Rene Moreno University in Santa Cruz were again postponed at the request of the University. Consultations were held with individual professors concerning research in soya and cotton planned on the universities new experimental farm. This property was dedicated on June 25. In general, efforts to collaborate at Gabriel Rene Moreno with formal courses and seminars has not been successful to date.

CID technicians continued to assist in student thesis advisement. To date the list of student advisees is as follows: 2 in economics, 3 in oil crops, 1 in potato diseases, and 4 from various areas of extension. In addition, a thesis coordinator has been appointed in Cochabamba to encourage and assist extension agents in completing their thesis and related University degrees.

In addition to the University related activities, CID technicians engaged in a series of other training activities:

1. Presented a seminar in Santa Cruz which discussed rice research results and the use of partial budgeting techniques in evaluating investments. Twelve extension agents attended.
2. Participated in an extension programming and planning course conducted by IICA. Thirty-five agents and technicians attended.
3. Participated in a 2-week credit course conducted by a team of U. S. experts. Twenty-six agents attended.
4. Participated in orientation seminar at Patacamaya concerning goals and purposes of IBTA.
5. Presented formal in-service, 2-hour seminar on benefit/cost analysis to the staff of the Planning Office.

Publications

1. Common-Property Rangeland and Induced Neighborhood Effects: Resource Misallocation in Bolivia Agriculture by Morris D. Whitaker and E. Boyd Wennergren. Published as CID Working Paper 001/76. Revised for publication as Technical Report.
2. Status of Agronomic Research in Bolivia: Saavedra, San Benito, Toralapa and Chinoli by R. L. Smith in cooperation with CID technical staff--CID Working Paper 003/76.
3. Guidelines for Publishing a Bolivian Agricultural Journal by R. L. Smith--CID Working Paper 004/76.
4. CID Program Review - Sector Management Component by Morris D. Whitaker--CID Working Paper 005/76.

5. An Assessment of the Temperate Fruit Research Program at San Benito Research Station by Anthony H. Hatch--CID Working Paper 006/76 (preliminary).

6. Small Farm Rice Management and Production by Emilio Salavas, Max G. Long, and Larry Bond (in final review for extension publication).

7. Principal Potato Diseases in Bolivia by Kenneth C. Ellis, Gerardo Caero and Segundo Alandia (being translated to Spanish). Represents a more elaborate study of potato disease than planned in previous publication entitled, "Nematode Identification and Problems."

8. Soya Production in Bolivia by Herbert Zurita and Warner D. Fisher (in writing process - awaiting results of 1975 research).

9. Partial Budgeting: A Decision Making Tool by Larry K. Bond (in process as extension publication).

10. Agricultural Credit Programs in Bolivia by Larry K. Bond (in process as extension publication).

Other Activities

An annual project review was held with MACA, CID and USAID representation. The Plan of Work for the current period was reviewed in detail and related to individual technician programs. Several agreements were reached and critical needs defined:

1. The concept of co-directorship of CID technicians and Bolivian counterparts was reaffirmed. CID technicians will have equivalent decision making authority and MACA will instruct Bolivian counterparts to this effect.

2. Annual research budgets for individual stations will be assigned directly to each station to be managed by the co-directors of the station.

3. CID technicians will assume special responsibility for technical programming.

4. CID technicians assigned as National Advisors will work at all levels and in all regions of the agricultural sector and are not limited to those areas defined by the project, i.e., Santa Cruz and Cochabamba.

5. Research emphasis at Toralapa will be on potatoes, at San Benito on cereals and fruit, and at Saavedra on rice, corn and oil seed crops. Chinoli will be developed as regional demonstration center.

6. Physical facilities such as road and electricity at Toralapa, irrigation facilities at Saavedra and San Benito and road construction and seed storage facilities at Saavedra are critical to program needs and will be given immediate priority.

CID technicians participated in the second annual agricultural fair held in Cochabamba. They collaborated in various planning phases and served as judges for several of the demonstrations.

Problems Encountered

Administrative

1. The problem of tax exemption for the Consortium and its technicians persists. Request for a Supreme Decree was initiated about 6 months ago but has not yet been approved. The Consortium is still not receiving the tax exemption as provided by the contract.

2. The liberation of 3 personal automobiles for CID technicians is still pending in the Contraloría. Efforts to secure liberation as provided by the Contract were initiated in January, 1976 but have met with continual delays in the Ministry of Finance and the Contraloría. It appears that there are contradictions in the Bolivian law and some aspects of the Contract related to tax and aduana matters.

3. There is still a need to finalize the housing allowance at a level which will reflect the demand pressures and the increased utility costs in Santa Cruz and Cochabamba.

4. Administrative problems continue to occupy large amounts of time both with the Bolivian Ministries and USAID. There is still no organized system for resolving administrative issues related to host-country contracting. Matters could be expedited considerably if the Contractor were assigned to a special office or person for assistance in all GOB Ministries and USAID.

Program

1. Counterpart funding has still not been approved for adding additional personnel to the Planning Office of the Ministry. As indicated previously, the absence of such personnel seriously limits the ability of CID to fulfill its contract responsibilities.

2. The delay in procuring laboratory and other equipment items and in construction of building planned under loan funding need to be rectified. Rising costs will reduce the purchasing effectiveness of the fixed amounts of money already approved. The delays in construction impede implementation of the "Service Center" concept.

3. Electrical supply at Saavedra, Chinoli and Toralapa remains inadequate. Priority should be given to these items.

4. Delays in delivery of individual station research budgets persist. Stations in the Cochabamba area have not received their first trimester budget and we are now entering into the second period.

5. Completion of the Toralapa greenhouse has been delayed due to the lack of generator power to operate the electric welder.

6. Plans for initiating publication of a professional agricultural journal are advanced and in need of Bolivian names to serve as Associate Editors. Nominations for these positions should come from the Ministry.

7. The operation of the Saavedra Station in Santa Cruz remains a matter of concern to CID, especially as it relates to the qualifications of new technicians to be assigned by CIAT and the responsibilities of CID technicians. This is fundamental to meeting our contract responsibilities.

8. There is a need for more clearly defined lines of authority with respect to the work assignment within the extension service. Ministry personnel are utilizing extension personnel without prior clearance from extension directors, sometimes at the expenses of scheduled extension programs. Closer coordination is warranted.

9. The concept of co-directorship of CID technicians and Bolivian counterparts has not been officially conveyed to the Bolivian technicians by the Ministry. CID technicians are becoming an integral part of the technical programs but have not yet been able to assume decision making authority with respect to station budgets.

10. The system of selecting Ministry employees for training outside Bolivia has not sufficiently incorporated the advisory expertise of CID technicians.